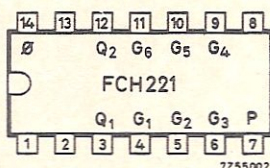
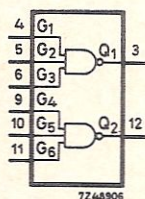


The FC family of DTL silicon monolithic integrated circuits has been designed for medium speed digital applications in computing, office electronics, telecommunication, instrumentation and industrial control.

DUAL 3-INPUT LINE DRIVER NAND GATE



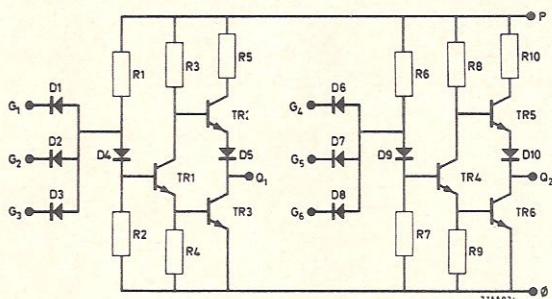
Package XG14; dual in-line

QUICK REFERENCE DATA

Supply voltage	V_P	$6.0 \pm 5\%$	V	
Operating ambient temperature range	T_{amb}	0 to +75	°C	
Average propagation delay time $N = 15$, $C_W = 250$ pF, $T_{amb} = 25$ °C	t_{pd}	typ. 35	ns	←
Available d.c. fan-out $T_{amb} = 0$ to +75 °C	N_a	$\geq$	14	
D.C. noise margin $T_{amb} = 25$ °C	M_L	typ. 1.2	V	
Power consumption per gate 50% duty cycle, $T_{amb} = 25$ °C	P_{av}	typ. 11	mW	

The FCH221 comprises two independent NAND gates incorporating bi-directional output circuitry for achieving high fan-out and for driving large capacitive loads. Typical applications are in parallel setting of registers, shift pulse driving and driving of long lines.

CIRCUIT DIAGRAM



LOGIC FUNCTION

G ₁	G ₂	G ₃	Q ₁
G ₄	G ₅	G ₆	Q ₂
L	X	X	H
X	L	X	H
X	X	L	H
H	H	H	L

$$\left. \begin{aligned} Q_1 &= \overline{G_1 \cdot G_2 \cdot G_3} \\ Q_2 &= \overline{G_4 \cdot G_5 \cdot G_6} \end{aligned} \right\} \text{ for positive logic}$$

H = HIGH state (the more positive voltage)

L = LOW state (the less positive voltage)

X = state is immaterial

RATINGS (Limiting values) ¹⁾

Supply voltage	V _P	max.	8.0 V
Output voltage	V _Q	max.	8.0 V
Input voltage	V _G	max.	8.0 V
Output current ²⁾	-I _Q	max.	20 mA
Input current ³⁾	-I _G	max.	20 mA
Voltage difference between any two inputs		max.	8.0 V
Storage temperature	T _{stg}		-55 to +125 °C
Operating ambient temperature	T _{amb}		0 to +75 °C
Output short-circuit duration; duty cycle 10% (either output, or both)	t _{Qsc}	max.	60 ms

¹⁾ Limiting values according to the Absolute Maximum System as defined in IEC publication 134.

²⁾ For negative output voltage in LOW state

³⁾ At this limit input voltage typ.: -1.5V.

SYSTEM DESIGN DATA

Uniform system temperature	T_{amb}	0 to +75 °C
Uniform system supply voltage	V_P	5.7 to 6.3 V
Available d.c. fan out	N_a	≥ 14
D.C. noise margin	M_L	min. 0.4 V
	M_H	min. 1.1 V
Average propagation delay time	t_{pd}	max. 113 ns
Equivalent input capacitance	C_G	typ. 7 pF
Supply current (duty cycle 50 %) ¹⁾	I_{Pav}	typ. 3.6 mA
Power dissipation at $T_{amb} = 75$ °C ¹⁾	P_{tot}	max. 65 mW

¹⁾ Both gates together; outputs not short-circuited.

FCH221

dual line driver

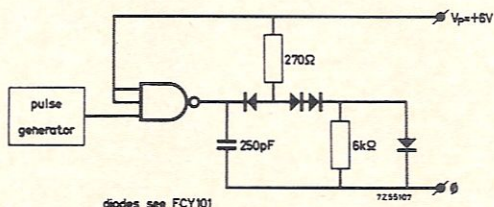
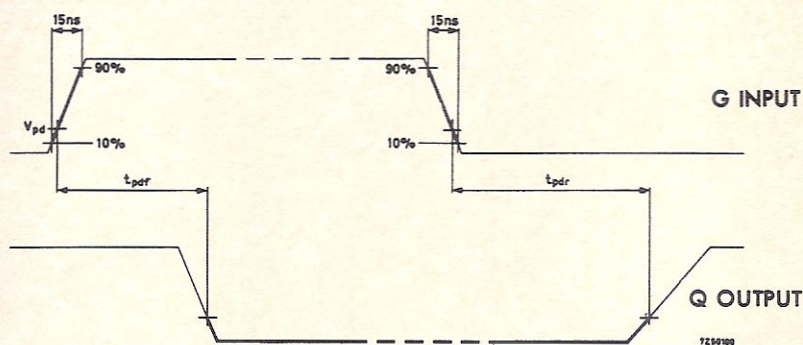
FC family

standard temperature range

9330 323 30XX0

CHARACTERISTICS

		T_{amb} (°C)			Conditions and references	
		0	+25	+75	V_P (V)	
<u>STATIC DATA</u>						
Output voltage LOW	V_{QLmax}	0.4	0.4	0.4 V	5.7 and 6.3	
at:						
Output current LOW	I_{QLmax}	25	27	26 mA	5.7	
		28	27	26 mA	6.3	
and at:						
Input voltage HIGH	V_{GHmin}	2.3	2.2	2.1 V	5.7 and 6.3	
Output voltage HIGH	V_{QHmin}	3.4	3.6	3.9 V	5.7	$I_Q = -30 \mu A$ $I_Q = -5 mA$
at:		2.2	2.5	2.9 V	5.7	
Input voltage LOW	V_{GLmax}	1.0	1.0	0.8 V	5.7 and 6.3	
Input current LOW	$-I_{GLmax}$	1.75	1.65	1.55 mA	5.7	$V_G = 0.4 V$ $V_G = 0.4 V$
		2.0	1.9	1.8 mA	6.3	
Input current HIGH	I_{GHmax}	1.0	1.0	25 μA	5.7	$V_G = V_{QHmin}$ other inputs 0 V
Output short circuit current	$-I_{Qsc}$	16.5	19.5	18.0 mA	5.7	$V_G = V_{GLmax}$ $V_Q = 0 V$
Supply current (both gates together)	I_{Pmax}	-	7.5	- mA	6.3	G inputs HIGH
<u>DYNAMIC DATA</u>						
Rise propagation delay time	$t_{pdr max}$	130	105	130 ns	6.0	$V_{pd} = 1.5 V$ $N=15; C_L = 250 pF$
Fall propagation delay time	$t_{pdf max}$	95	80	95 ns	6.0	$V_{pd} = 1.5 V$ $N=15; C_L = 250 pF$

CHARACTERISTICS (continued)
DYNAMIC DATA


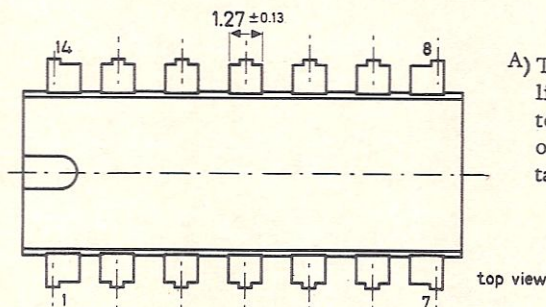
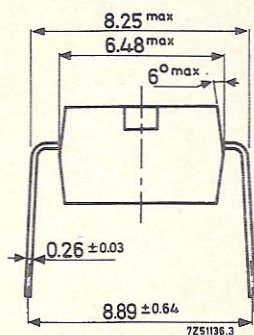
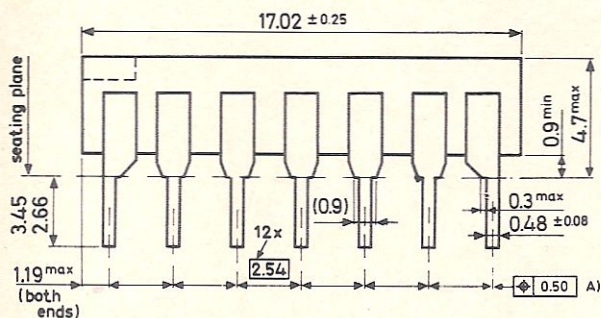
Equivalent load for $N = 15$ and $C_L = C_W + C_G(N - 1) = 250 \text{ pF}$

Waveforms and loading circuit illustrating measurement of t_{pdr} and t_{pdf} .

PACKAGE OUTLINE

XG14; dual in-line

Dimensions in mm



A) The spacing between center-lines of any two pins is equal to the true position spacing of 2.54 mm per pin with a total tolerance of ± 0.25 mm.

Handling notes

1. Devices may be soldered directly into circuits with soldering irons. At iron temperatures below 245°C the maximum soldering time should be less than 10 seconds and at iron temperatures between 245°C and 400°C the soldering time should be less than 5 seconds. In both cases the soldering iron should be applied below the seating plane (see outline drawing).
2. Devices mounted up to the seating plane on a printed circuit board may be dip or flow soldered providing the solder temperature is below 245°C and the time of immersion is less than 5 seconds. The body temperature should not be allowed to exceed the maximum storage temperature during soldering. If excessive pre-heat cycles are used, it may be necessary to cool the printed board immediately after leaving the solder bath/wave in order that this requirement is met.